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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138  
Carson City, Nevada 89706

October 27, 2003

Mr. Dave McCarthy  
Atlantic Richfield Company  
317 Anaconda Road  
Butte Montana 59701

**SUBJECT: Draft Final Wabuska Drain Work Plan, Yerington Mine Site**

Dear Mr. McCarthy:

The Nevada Division of Environmental Protection (NDEP) has received and evaluated the, Draft Final Wabuska Drain Work Plan dated April 7, 2003 regarding the continued environmental investigation of the Yerington Mine, located in Lyon County near Yerington Nevada. This office provides the following comments from NDEP, EPA, BLM, U.S. Fish and Wildlife and other technical representatives of the Yerington Technical Work Group (YTWG).

The following comments are based on review of both the April 7, 2003 Response to Comments on the Draft Wabuska Drain Work Plan, dated April 30, 2003 provided by Atlantic Richfield Company (ARC) and the Draft Final Wabuska Drain Work Plan, dated April 7, 2003. Comments that require clarification or discussion are listed below. The appropriate heading and comment numbers follow the numbering format used in the document.

Comments on Atlantic Richfield Company's Response to Comments, dated April 7, 2003 on the Draft Wabuska Drain Work Plan, dated April 30, 2003

Introductory Comments

**Response to Comment no. 1:** *The Conceptual Site Model (CSM) was submitted on October 10, 2002 and was subsequently approved by the regulatory agencies. The attached Draft Final Work Plan reflects the information presented in the CSM.*

In the original comment the regulatory agencies noted that following the development of a site conceptual model, a broader site characterization should be completed. How does the Draft Final Work Plan actually reflect the need for a broader characterization beyond describing the components of the CSM? In reading the text such a broader characterization is not readily apparent.

### **Comments for the Short-term Action Sampling**

**Response to Comment no. 1:** *Please see response to Introductory Comment no. 2 above, and the attached Draft Final Work Plan.*

In the original comment the regulatory agencies noted issues with the originally proposed sampling locations which were subsequently modified following a site visit by the members of the Yerington Technical Work Group (YTWG). The YTWG selected eight locations and these modified locations were sampled in February 2003 and reported in the Draft Final Wabuska Drain Work Plan, dated April 7, 2003. The discussion of the sampling at these eight sample locations in the text of the Draft Final Work Plan does not provide discussion of the rationale for sample location selection or data quality objectives. In particular how the actual selected locations may relate to the original comment is not provided. To better evaluate how representative the February 2003 sampling is, in particular since it is being proposed as a baseline for comparison to subsequent monitoring, further explanation should be provided.

### **General Comments on Atlantic Richfields Draft Wabuska Drain Workplan**

**Response to Comment no. 1:** *Atlantic Richfield believes that the soil/sediment data collected from the Wabuska Drain in February 2003 will not change in character because no solid materials from the mine site will enter the Drain prior to site closure. The eight monitoring locations selected by the YTWG were determined to be sufficient to satisfy the DQOs stated in the attached draft Final Work Plan, and additional monitoring locations will not be necessary. It is not anticipated that additional solids sampling from the eight monitoring locations selected by the YTWG will be conducted, since these locations included potential depositional areas (as selected by YTWG). Data interpretation will be presented in the Data Summary Report for the Wabuska Drain Work Plan.*

*Atlantic Richfield proposes to conduct surface water monitoring at the eight locations described in the attached Draft Final Work Plan when flowing surface water is observed in the Drain immediately north of the mine site (i.e. at locations 1 and 3 of Figure 3 of the attached Draft Final Work Plan). Monitoring of surface water in the Drain prior to this occurrence of flowing surface water at locations 1 and 3 will not provide useful data in evaluating the effect of the mine site on surface water flows in the Drain. Pending the results of this future surface water monitoring event, Atlantic Richfield does not anticipate that additional surface water monitoring will be required because the irrigation conditions that will produce flowing surface water in the Drain are anticipated to generally remain the same.*

In the original comment the regulatory agencies noted that an expanded characterization would require sampling over a period of time to capture different flow event along with sampling at different locations; to assess varying levels of potential contamination in different stretches of the Drain as well as the Walker River, and discrete sampling in depositional areas. While an ongoing monitoring sampling plan would not be necessary if (1) runoff from the tailings piles is completely controlled; and (2) there are no secondary sources of contaminated sediments from prior releases that could be mobilized by later events or changes in conditions and (3) there is no possibility of migration from contaminated groundwater into the drain and contaminating the sediment and/or surface water none of these factors seem to be addressed by the sampling conducted previously or proposed in this work plan. Portions of the surface of the tailings piles indicate erosion and since the tailings pile have not been covered how is the statement justified that no solid materials from the mine site will enter the Drain prior to site closure? Also what is the basis for the determination that the DQOs have been met and that no additional locations are required? Also what analysis has been done to determine that the samples chosen are representative of the depositional areas of the Drain beyond the initial site visit by the YTWG? Also how does the February 2003 sampling evaluate the migration of shallow groundwater migrating from the mine site into the Drain? Also of concern is the resuspension of sediments from past events particularly those sediment excavated in prior times and placed on the berm and later transported back into the drain by agricultural activities. What is the basis for the assumption that irrigation conditions will not change?

### **Specific Comments on Atlantic Richfield's Draft Wabuska Drain Workplan**

**Response to Comment no. 2 :** *Atlantic Richfield is uncertain what value the suggested reference to the 1983 flood event would add to the Work Plan - please provide (non-anecdotal) information as to why this information is relevant. The fourth paragraph under Section 1.2 of the attached Draft Final Work Plan has been revised to avoid the apparent confusion.*

The regulatory agencies noted in the original comment that it would be helpful to note that there was also a flood event in June 1983 which was unrelated to winter rain on the mountain snow pack. In this specific situation the occurrence of a flood event in June which is large enough to register above the usual flow due to the melting of the snow pack indicates that anomalous situations do arise on occasion that need to be taken into account in any technically sound analysis, even if the expected occurrence may be sporadic. Also please note that, based on this reviewer's interpretation, the statement does not seem anecdotal but rather provides a qualitative technical factor that should be taken into account when evaluating the data.

**Response to Comment no. 3:** *The attached Draft Final Work Plan has been revised to reflect most of the comment. Additional data from monitoring and sampling conducted in February 2003 is provided in the attached Draft Final Work Plan*

The regulatory agencies noted that the original text did not include a complete listing of the elevated constituents at WSW-011 in particular omitting aluminum, cobalt, copper and lead and that total petroleum hydrocarbons were also elevated. When reviewing the text in the Draft Final Wabuska Drain Work Plan the constituents noted as having been omitted in the Draft are still omitted. Please clarify what revisions have been made to "reflect most of the comment" and please explain the basis for those portions that were omitted.

**Response to Comment no. 4:** *The attached Draft Final Work Plan clarifies this statement.*

The original comment from the regulatory agencies noted that the original text on page 6 was misleading in stating that "...these constituents were not transported down gradient..." and that transport could certainly occur under different flow conditions and requested that the statement be clarified. The revision provided in the Draft Final Wabuska Drain Work Plan consists of modifying the original text in the Draft Wabuska Drain Work Plan which reads "However, because this sample was collected from stagnant water at this location, these constituents were not transported down-gradient (i.e. non-flowing conditions resulted in no loading of these constituents)" to read in the revised version as " However, because this sample was collected from stagnant water at this location, these constituents were not transported down-gradient (i.e. non-flowing conditions resulted in no *transport* (note italics provided by this author) of these constituents)." How does the change in text provide clarification and address the concerns regarding the potential impact regarding differing flow conditions at different times?

**Response to Comment no. 5:** *The attached Draft Final Work Plan incorporates the suggested information in the document text.*

The regulatory agencies suggested that information regarding pH and specific conductance be added to Table 1-2 for the 1999 sampling event to allow for a more complete evaluation of the data. The Draft Final Work Plan does contain a sentence indicating that the Appendix A provided in the Draft Work Plan presents field monitoring data such as pH and specific conductance. ARC suggests in the response that the readers should search through the field data sheets to find the information although it does not seem too time intensive to add pH and specific conductance to Table A.

**Response to Comment no. 6:** *The attached Draft Final Work Plan has been revised to note this increase observed in 1983. The soil pH and metals data collected in February 2003, and provided in the attached Draft Final Work Plan, do not support the concept suggested by this comment. In other words, locally increased soil pH does not correlate with any increase in soil metals concentrations and soils metals concentrations in this part of the Drain are well within background values provided by Shacklette*

*and Boerngen (1984)l. Therefore, Atlantic Richfield believes that additional soils monitoring from the Wabuska Drain is not warranted.*

The regulatory agencies noted in the original comment that the pH of the drain water in 1983 increased markedly between stations 4 and 5, suggesting that this portion of the drain could be an area where metals and trace elements could have precipitated out of the water due to changes in pH. This situation could warrant additional evaluation of the drain sediments and soils piled on the banks of the drain. Review of the text in the Draft Final Work Plan does not indicate any revision or change in text as stated in the response to comment. The text and Table 1-1 in the Draft Final Work Plan are unchanged from the Draft Work Plan beyond the addition of the data from the February 2003 sampling. ARC has stated that the soils pH and metals data collected in February does not support the concept suggested in the original comment. It does not appear justified to assume that (1) the environmental conditions for the February 2003 data is comparable to that of the March 1983 data, or (2) that a direct comparison between the surface water pH and associated soil pH is technically justifiable, or (3) that background values provided by Shacklette and Boerngen (1984) are appropriate for the site.

In regards to the first point, although both the 1983 and 2003 sampling events were conducted in the winter, in March and February respectively, sampling during the 1983 event encountered surface water in the Drain in stations 1 through 5 while the 2003 event did not encounter any surface water in stations 1 through 5 while only encountering surface water from stations 6, 7 and 8. As a result the surface water pH samples reflect different reaches of the Drain and confounding factors such as the flow coming into the Drain in the area of stations 4 and 5 from the West Campbell drain.

The concept suggested in the original comment reflects the established geochemical changes in transport of metals in water due to changes in pH and Eh which result in the precipitation of metals and trace elements at these boundaries. Such changes can be enhanced by humic materials and other soil aspects as well. In fact ARC and Anaconda used such pH and Eh changes during the exploration for sedimentary uranium deposits in the 1970s in the western U.S. Also, due to a variety of geochemical factors the direct correlation of surface water pH with soil pH is very difficult to establish without multiple lines of data.

Finally the Shacklette and Boerngen (1984) metals' background values are derived from the evaluation of concentrations over the entire continental U.S. ARC should demonstrate how these values are appropriate for the site. Please discuss this with the regulatory agencies. Therefore in summary it does not appear that the proposed comparison is appropriate and more soils monitoring may be appropriate.

**Response to Comment no. 9:** *Such conveyances, where exposed, will be evaluated pursuant to the Draft Final Tailings Areas and Evaporation Ponds Work Plan. Because the attached Draft Final Wasbuska Drain Work Plan addresses the current physical and chemical conditions in the Drain, the extent of potential effects (e.g. elevated soil metals concentrations) caused by past releases to the Drain has been captured by the February 2003 soils monitoring described in the attached Draft Final Work Plan, and will be captured by proposed surface water monitoring in the Drain to be triggered by the observation of flowing surface water immediately north of the mine site.*

The regulatory agencies noted in the original comment that other conveyances that have been connected in the past or appear to have been connected to the Wabuska Drain should be evaluated for previous contamination as potential source areas for off site contamination. As such, addressing these conveyances under other work plans may be appropriate but to properly evaluate the necessary integration and coordination of the various investigations a summary of what is being considered needs to be included in this work plan. Also investigations of such conveyances need to address in some manner those locations where they are known or suspected to exist even if not exposed currently. Finally the determination that the February 2003 sampling has adequately captured the extent of past releases is not supported by the data provided in the Draft Final Work Plan, in particular in regards to sediment excavated from the Drain in the past and placed along the berms bounding the Drain. Also the Draft Final Work Plan proposes to monitor surface water flow to be triggered by the observation of flowing surface

water. The frequency of observation is not included in the Draft Final Work Plan. The observation and evaluation of the need for surface water monitoring should be conducted to obtain representative conditions to capture seasonal changes as well as any operational changes such as changing irrigation conditions or surface runoff events.

**Response to Comment no. 15:** *Beryllium was included in the analyte list, as presented in the attached Draft Final Work Plan. Uranium was not included.*

Uranium must be included in the analyte list due to the recent discovery of data from past radiological surveys, including data on elevated concentrations of uranium in groundwater in the area of the contaminated groundwater plume. Therefore uranium and associated daughter products such as radium need to be added to the list of analytes for all soil and water sampling. Please see specific comment #6.

### **Specific Comments on the Draft Final Wabuska Drain Work Plan, dated April 7, 2003**

**Page 3, paragraph 3** – This paragraph states that groundwater conditions in the vicinity of the Wabuska Drain “...are described in the Draft Final Groundwater Conditions Work Plan...” Rather than relying solely on a reference to another document, this work plan should include a brief description of groundwater conditions in the vicinity of the Drain, with a reference to the groundwater work plan for specific details. At a minimum, the discussion should include groundwater depth, flow direction and gradient.

**Page 4, 1.3 Previous Monitoring, 1994** - This section of the Plan fails to include data from the U.S. Geological Survey report by Seitz (1982), which provides information on specific conductance of water in the Wabuska Drain at Luzier Lane. The data were collected in both 1976 and 1980. See page 45 of their report.

**Page 6, 1.3 Previous Monitoring, 1994-** Thodal and Tuttle (1996) also sampled the Drain at their site number 14; data from this site should also be included in the Plan in Appendix A. Table 10 of Thodal and Tuttle (1996) should also be included in Appendix A, as it provides important data on dissolved trace element constituents in surface water samples from two sites on the Drain.

**Page 7, 1.3 Previous Monitoring, November 1999-** In the last paragraph of this section it is implied that because the water was stagnant at site WSW-011 at the time of collection, that the contaminants would not be transported down-gradient. Down-gradient transport could occur at any future time with flow in the Drain. In the same paragraph there are inconsistencies in listing constituents with elevated concentrations relative to down-gradient samples. For consistency, the following constituents should be added to the list that was provided in parentheses: aluminum, cobalt, copper, and lead. The data on total petroleum hydrocarbons in the Drain samples should be included in the Plan. The concentration at site WSW-011 was elevated.

It would be helpful to provide a discussion of water quality in the Drain near the mine in relation to the quality of waste fluids as presented by Seitz et al. (1982), with additional data on water quality in the area unaffected by the mine. This may aid in understanding possible inputs to the Drain (e.g., constituents and concentrations) from shallow ground water contamination from the Yerington Mine.

**Pages 8 & 10, 1.3 Previous Monitoring, February 2003-**In the third paragraph of this section it is inappropriate to have sampled soil from above the saturated water line in the Drain and then present the data as representative of Drain sediments and also compare the data to sediment samples from dry sites elsewhere along the Drain. These soil samples from above the water line clearly do not represent drain sediments.

The last sentence of the last paragraph of the section is incorrect. The mercury chronic (96 hour) aquatic life standard is 0.012 g/L for unfiltered samples. The three water samples had mercury concentrations about two orders of magnitude higher than this standard, ranging from 1.1 to 1.4 g/L. Also, the chronic



aquatic life standard for lead was essentially the same as the detection limit for the analyses; therefore, it cannot be said with certainty that the Nevada standard was met for this metal.

**Page 9, Section 1.3** – The first full paragraph refers to “...three samples from two locations...” that exceed reported background levels (selenium and iron). What are the background levels for the other analytes? How many sample results approached background levels? For example, only two samples are reported as exceeding the selenium background range of 0.15 to 0.31 mg/kg, but Table 3 shows that four additional samples exceeded the lower end of that range. A more complete discussion of these results may support the statement in Section 3.0 that additional soil sampling is unnecessary.

**Page 12, 1.4 Data Quality Objectives** - The discussion of Step 3 of the DQO process states that “Relevant historical and anecdotal information includes knowledge of Drain construction, operations and maintenance, past Drain alignments, previous field monitoring and analytical results, and down-gradient receptors.” Information is provided on all of these with the exception of an adequate accounting of receptors. The identification of receptors is needed before determining what samples should be collected and where the samples should be collected. For example, we have observed waterfowl use on sections of the drain which contained water. Their presence indicates, at a minimum, the need to also collect and analyze food items from these sections of the drain to determine concentrations of various constituents in pathways. Data on contaminants in food items would greatly aid in ecological risk assessment.

**Page 14, 2.0 Historical Alignment-** Information in the first paragraph indicates that there has been minimal maintenance of the Drain and implies that the Drain is not cleaned (e.g., sediment removal) periodically. When the Yerington Technical Work Group participated in the selection of sampling sites along the drain, several individuals noted the presence of small areas of red sediment along the berm of the drain at least as far north as site 6. This color of this material was similar to that noted at sample site 2 in the abandoned portion of the drain where elevated concentrations of several constituents were found. No similar colored material was noted in adjacent fields. This suggests that the Drain may have been cleaned at some point(s) and time(s) in the past. Samples of these materials on the berm should be collected for analysis to determine if they contain elevated concentrations of metals. If these materials are contaminated and are washed back into the Drain they could re-contaminate the Drain. Also, the location and northward extent of the presence of these stained materials should be determined and should include an examination of the Drain berms all the way to its confluence with the Walker River. This information is needed to determine the extent of past movement of contaminated sediments

in the Drain to determine if they may have reached the Walker River and exposed ecological receptors there.

**Page 18, 3.0 Work Plan** - We disagree with the last sentence of the first paragraph because Drain sediments were not collected at sites 6 to 8; instead bank side soils were collected, which are not representative of sediments in the bottom of the Drain. Sediment samples must be collected at these sites using appropriate techniques. An additional site in the drain just upstream from the confluence with the Walker River should also be sampled to determine the possible movement of contaminants.

**3.2 Quality Assurance and Quality Control:** No information was provided on analysis of duplicate samples that should have been collected in 2003. Were such samples collected and if so where are the data? Information should also be provided on the analysis of a soil/sediment sample with known concentrations of metals and trace elements (reference sample) to further evaluate laboratory methods. Such information on analysis of duplicate and reference samples should be a part of all future reports.

**Page 29, 3.4 Site Job Safety Analysis** - Consideration should be given to risks of handling samples with possibly elevated concentrations of radionuclides.

**Table 6:** Uranium should be included in the analyte list due to the recent discovery of data from past radiological surveys, including data on elevated concentrations of uranium in groundwater in the area of

the contaminated groundwater plume. Uranium may have found its way into the Drain along with other documented contaminants.

**Appendix A:** It would be helpful to include Table 2 from Thodal and Tuttle (1996) for more detailed descriptions of site locations that were sampled along the Drain. Table 10 from this report should also be included as indicated above.

**Section 2.0** – This section refers to Appendix C and photos C1 – C8. Appendix C contents are actually labeled B1 – B8.

**Figure 5** – Figure 5 (Conceptual Site Model Flow Diagram) was added to the document in response to General Comment #4. However, there is no reference to Figure 5 within the text of this work plan and no discussion of potential risks to human health or the environment beyond the introductory sentence of Section 1.0. This figure needs a reference and discussion in the text.

**Table 3** – Although the Table uses boldface type to indicate values that exceed background levels, there is no indication of what these background levels are. Please add another column or provide a separate table that lists the background levels and their source.

**Table 6** – In the response to Comment #15, ARC states “Beryllium was included in the analyte list...” and “...Uranium was not included.” What is the rationale for not including uranium? Based on discussions regarding the Process Areas Work Plan, ARC agreed to add a subset of samples for radionuclides and radionuclides should be added to the analyte list for the Wabuska Drain. Also, ARC should evaluate whether additional soil samples should be taken to ensure deposition has not occurred in the drain sediments.

Accordingly, Atlantic Richfield has indicated that you would like to have a meeting with the Agencies to discuss these comments and to facilitate a successful final document. Please contact this office not later than November 10, 2003 to discuss acceptable meeting dates. The final document will be due within 30 days of the scheduled meeting as per the approved submittal schedule.

Should you have any questions or if I can be of any assistance, please do not hesitate to contact me at (775) 687-9376 or FAX (775) 687-6396. All future correspondence regarding this subject should be addressed to the undersigned.

Sincerely,



Arthur G. Gravenstein, P.E.  
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